CHANGES IN SEXUAL BEHAVIOR OF HOMOSEXUAL AND BISEXUAL MEN SINCE THE BEGINNING OF THE AIDS EPIDEMIC

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Introduction

Because there is neither a cure nor a vaccine for Acquired Immunodeficiency Syndrome (AIDS), the most important AIDS public health agenda is to prevent those not infected with Human Immunodeficiency Virus (HIV) from becoming infected with it. As a general rule, the behaviors which transmit HIV infection are intensely private and beyond the reach of effective government control. For this reason only voluntary changes in behavior will stop the epidemic from spreading.

AIDS is one of the most dangerous viruses affecting humans; few other viral infections are as virulent as HIV (Francis and Chin, 1987). Data from the San Francisco Hepatitis B-AIDS cohort study (Hessol, et al., 1987) show how devastating the virus can be. In the early days of the epidemic, it was hoped that only a small proportion of those infected with the virus would develop AIDS. Estimates from this cohort now indicate that 15 percent will develop AIDS after 5 years of infection, 24 percent after 6 years, 31 percent after 7 years, and 36 percent after 88 months. An additional 40 percent developed ARC symptoms by the 88th month of infection--i.e., symptoms and opportunistic infections which interfered with the quality of life, induced depression, and which can be life threatening in and of themselves. Only 24 percent of the original cohort had no symptoms at all after 88 months of infection, although over time it is widely assumed that the proportion of the cohort will continue to dwindle. Current estimates from the investigators indicate disease rates of 65 percent to 100 percent after 16 years of seroconversion (Hessol and Lemp, 1988).

AZT, has proven to be effective in treating some patients with AIDS and offers hope to others infected with HIV but who are not yet manifesting AIDS symptoms (Fischl, et al., 1987; Yarchoan and Broder, 1987). Most encouraging are the reports of beneficial effects with patients with ARC. Not only were the death rates among AIDS patients lowered (3.3 percent for those on drug vs. 27.5 percent for those taking placebo), but the side effects were less severe for ARC cases as well. However, it is important to note that after one year, the death rate among AIDS patients on AZT was 6 percent. Further, 45 percent of all persons on the drug experienced bone marrow suppression resulting from anemia and neutropenia.

The drugs currently under investigation here in the United States and elsewhere offer additional hope and consolation. However, given the action of retroviruses, it is probable that a cure for AIDS will be very hard to find. For at least the foreseeable future, it appears that HIV infection will probably be chronic. Those who have it should expect that they will need to be treated for life. Analogies to this sobering conclusion are easily found among those who suffer from other common medical conditions: hypertension and diabetes have been well-recognized public health problems for a long time and yet these conditions are still associated with premature mortality.

AIDS was first identified among homosexual and bisexual men; in fact, it was first named Gay Related Immunodeficiency Syndrome or "GRIDS." A total of 65 percent of the reported cases in the United States are among homosexual and bisexual men without other known risk factors. An additional 8 percent of cumulative AIDS cases have occurred among men who are both homosexual and IV drug users. The Centers for Disease Control projects little change in these distributions through 1991. Thus, for good reason, considerable attention has been devoted to identifying specific risk factors for HIV infection and

describing the prevalence of these risk behaviors among homosexual men and other specific groups Educational programs to lower the prevalence of risk behaviors have already been designed for homosexual/bisexual men and there is increasing interest in identifying what more can be done to contain the spread of infection in this and other groups at high behavioral risk for AIDS.

This paper seeks to describe the degree to which homosexual and bisexual men have changed specific sexual practices[1], the correlates of behavioral risk reduction, the degree to which these changes can be attributed to specific educational or public health programs (e.g., testing for antibodies to HIV, contact tracing, community organization), and the costs of these specific programs.

Two major factors limited the execution of this analysis. The first was the difficulty in obtaining data. There is an extraordinary explosion of AIDS-related research; much of the behavior change data have not yet or have only recently reached the usual publication channels. Three types of literature searches were used to identify existent literature:

O A MEDLINE search using BRS Colleague examined all of the citations on AIDS appearing in the last three years. Examination of this literature base and the references in the articles retrieved yielded a few papers of interest. It appears that many of the behavioral AIDS studies have not yet found their way into the usual scientific journals.

Through the resources of the Center for AIDS Prevention Studies (CAPS) at the University of California, San Francisco (a research center funded collaboratively by National Institute of Mental Health (NIMH) and National

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1 This discussion is restricted to sexual behavior. Another paper prepared for OTA discusses AIDS education among intravenous drug users, including homosexual and bisexual men (Des Jarlais, 1988).

Institute on Drug Abuse (NIDA)), the authors had access to the AIDS Weekly Reader, a compilation of published research journals, Centers for Disease Control (CDC) publications and media reports on AIDS. This was enormously helpful in finding both published and presented citations of relevance.

O Finally, the authors examined thoroughly the abstracts of the Third International Conference on AIDS and attempted to obtain original papers of relevant abstracts where possible. If the papers and original data were not available, the authors relied on the abstract for information.

Additional avenues were used to obtain information in this rapidly expanding area. The authors called key investigators and people involved in program development, implementation, and evaluation (see Appendix A) to obtain additional data or papers, or leads to other investigators who might have relevant data.[2] Also contacted were the San Francisco AIDS Foundation, the San Francisco AIDS Health Project, the AIDS Project Los Angeles, the Gay Men's Health Crisis in New York, HERO in Baltimore, and the Whitman Walker Clinic in DC to obtain any available information about programs, evaluations, and costs. The authors have been involved actively in behavior change

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2 The authors were pleased and gratified at the cooperation and willingness of most investigators and programs to share even preliminary writeups of their material.

research in the homosexual and bisexual populations since the beginning of the epidemic. This has led to local and national involvement that has put them in touch with most of the research currently in progress.[3]

The second factor limiting this analysis lies in the nature of the data available. While many agencies have been busy in developing programs aimed at the homosexual and bisexual communities, there have been few evaluations of the efficacy of these programs. Thus, data are limited regarding the efficacy of specific programs on behavior change. Nonetheless, the data that in this paper are useful in documenting what is currently known of the extent of behavior change that can be achieved, current levels of behavior capable of spreading the virus, and the impact of some specific programs on behavior change.

The Epidemiology of HIV Infection by Male-to-Male Sexual Contact

This report of behavior change will focus on three outcomes of interest in the epidemiology of HIV infection: number of male sexual partners, unprotected receptive and insertive anal intercourse, and condom use. Focus on these three outcomes is justified by current epidemiological understandings of HIV transmission.

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3 One of the co-authors of this report (R. Stall) attended a conference at the Centers for Disease Control on October 8-9, 1987 devoted to the topic of quantifying changes that have occcurred so far and correlates of change and failure to change in this population. The senior author of this report (T. Coates) has been appointed to a committee of the National Academy of Sciences whose task is to review the state of behavior and behavior change in the population at large. The senior author also sits on the NIMH AIDS Policy Subcommittee of the National Mental Health Advisory Committee and through this involvement has access to current and future research funded by this agency. Thus, the authors believe that they have beer as complete as possible in locating relevant studies.

Epidemiological data on the transmission of HIV within homosexual men were limited, in the early research, to inferences drawn from cross-sectional and case-control studies. Several of these investigations showed that receptive anal intercourse, receptive manual-anal intercourse ("fisting"), and a large number of male sexual partners were the major risk factors for AIDS and seropositivity to HIV (Goedert, et al., 1984; Melbye, et al., 1984). These initial investigations also showed a low risk of exposure from oral-genital contact (Jeffries, et al., 1985; Scheuter, et al., 1986; Lyman, et al., 1986).

These observations have been replicated and refined in the longitudinal analyses of the San Francisco Men's Health Study (SFMHS) and the Multicenter AIDS Cohort Studies (MACS). The SFMHS is a prospective study of a random sample of single men 25 to 54 years of age who live in the 19 census tracts of San Francisco where the AIDS epidemic has been the most intense. Subjects were interviewed semi-annually, and serologic and immunological status and physical examination findings were documented at these semi-annual clinic visits. Winkelstein, et al. (1987b) reported that a high number of sexual partners and the practice of anal receptive intercourse were associated with seropositivity. Those homosexual/bisexual men reporting no partners or a single partner during the two years before entry had relatively low levels of HIV seropositivity (18.1 percent) compared to those reporting two to nine partners (31.6 percent). For those reporting more than 50 partners in the two years before entry, the prevalence was increased by a factor of four (70.8 percent). Those practicing anal intercourse receptive (or both receptive and insertive) had an adjusted relative risk of 2.1 ($p = .004$) and 2.5 ($p = <.001$, respectively), compared to 1.3 ($p = .38$) and 1.0 for those practicing only insertive or no anal intercourse respectively. The relative risk for

oral-genital contact only was 1.01 (p = .97) (see also Lyman, et al., 1986). Douche or enema before sexual contact contributed to risk of infection by receptive anal contact.

The MACS extended these findings by defining risk factors for seroconversion in a longitudinal study. This collaborative study recruited a cohort of homosexual and bisexual men from four locations (Los Angeles, Baltimore, Chicago, and Pittsburgh). Baseline examinations were obtained for 4955 men. Receptive fisting, enema/douche use before intercourse, and perianal bleeding were strongly associated with prevalent HIV infection in the cross-sectional analysis (MACS, 1985). In a report dealing with 2507 men who were seronegative at the beginning of the study and who completed the 6-month follow-up examination, Kingsley, et al. (1987) reported a seroconversion rate of 3.8 percent (n = 95). Receptive anal intercourse was the major mode of acquisition of HIV infection; discontinuation of this practice sharply reduced the likelihood of seroconversion in 6 to 12 months of follow-up. Receptive anal intercourse was the only sexual practice associated with an increased risk of seroconversion to HIV in this study and could account for nearly all new infections. The gradient of risk of seroconversion accelerated in proportion to the number of receptive anal partners, from about 3-fold for one partner to 18-fold for those with 5 or more partners during the observation period. Six of the 9 seroconverters who denied receptive anal intercourse in the 6-month longitudinal follow-up period practiced this activity within 6 months previous to the initial evaluation. The remaining 3 seroconverters denying this activity practiced insertive anal intercourse during the pre-enrollment and follow-up period. Detels, et al. (1987) reported no seroconversions over 18 months for those not practicing receptive or insertive anal intercourse; 60 percent of those failing to seroconvert engaged in sexual practices without anal intercourse.

None of the investigations are willing to rule out the possibility of risk associated with sexual activities other than unprotected anal intercourse. The sizes of the subsamples under study for these practices generally have been insufficient to provide the necessary statistical power to reject the possibility of small relative risks associated with such practices. Thus, further analyses and studies are needed to define more precisely the risk associated with these practices or to determine that they are in fact safe, even when conducted with an infected individual.

Condom Use

Safer sex guidelines generally list the use of condoms during anal intercourse as "possibly safe" rather than "unsafe". This strategy is supported by studies of the impermeability of condoms and by behavioral theory, which indicates that substitution of acceptable alternatives for proscribed behaviors is more likely to lead to a reduction in those behaviors than is proscription alone (Kelly and St. Lawrence, 1986). The transmission of HIV infection in the natural environment with the use of condoms is not known. Several studies have demonstrated the impermeability of condoms to sexually transmitted disease (STD) agents. Conant, et al. (1986) found that condoms were effective barriers against HIV. A total of 12 varieties of latex and natural membrane condoms were tested as barriers to herpes simplex viruses 1 and 2, cytomegalovirus, and HIV. None of the viral agents passed through the latex, while there was occasional leakage with the natural membrane condoms. Nonoxynol-9 was also found to be cytotoxic to HIV

(Schesney, et al., 1987). Studies using HIV infection as the dependent measures to estimate the failure rate (and the reasons for these failures) are underway.[4]

Prevalence and Incidence of HIV Infection in Homosexual and Bisexual Men

Homosexual and Bisexual Men in the United States. Four estimates have been made of the prevalence of HIV infection in the United States. These estimates derive from three variables, none of which can be determined with precision: 1) the size of the homosexual and bisexual male population, including those who only occasionally engage in homosexual acts, 2) the prevalence of infection, and 3) the incidence of infection.

Prevalence of Infection. Estimates of the prevalence of infection vary widely. Curran et al. (1985) estimated that 750,000 Americans were infected in 1985. The Coolfont Report (Public Health Service, 1986) concluded that there were between 1 and 1.5 million IV drug users and homosexual men infected with HIV in mid 1986. The authors of this report estimated that 2.5 million men between the ages of 16 and 55 were exclusively homosexual throughout their lives and 5 to 10 million more have some homosexual contact. This was based on the Kinsey, et al. (1948) estimates that 4 percent of all males were exclusively homosexual, and that 37 percent had at least one homosexual experience to orgasm in their life. Note that the Coolfont Report (Public Health Service, 1986) used the Kinsey, et al. (1948) data to estimate the number of homosexuals in the United States. However, even when published, the Kinsey data were regarded as unreliable in making such estimates because the

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4 One such study funded by the National Institute of Child Health and Human Development is beginning at University of California Los Angeles. Roger Detels MD is the Principal Investigator.

research did not use probability sampling and the respondents were disproportionately drawn from midwestern and college educated populations. Whether these estimates still hold today remains conjecture as well. However, better estimates of the size of the homosexual male population are not available.

Rees (1987) estimated the number of total infections in the United States at about 2.5 million; the calculations attempted to take into account the number of diagnosed cases and assumed a normal distribution of time from infection to diagnosis of 15 þ 5 years. Sivak and Wormser (1985) estimated that 1.75 million people in the United States had been infected by mid-1985. This estimate was made by calculating that the ratio of those living with AIDS to those infected with HIV was 1:300.

Estimated Seroprevalence and Seroconversion to HIV Among Homosexual and Bisexual Men. There is only one population-based estimate of the prevalence of infection among homosexual/bisexual men. Winkelstein, et al. (1987a) reported that the prevalence of HIV seropositivity among the SFMHS cohort rose from an estimated 22.8 percent in 1982 to 48.6 percent during the latter half of 1984. Since that time, the prevalence of HIV seropositivity has been stable in the cohort: 49.6 percent during the second examination cycle, and 49.3 percent during the third and fourth cycles (latter half of 1985). These same investigators reported marked reductions (to be reported in more detail later) in anal intercourse insertive and receptive before and during the period of study. Communication Technologies, Inc. (1987) estimated that there were about 70,000 homosexual men in San Francisco (about 10 percent of the population). If both of these population estimates are correct, this would indicate that about half of the homosexual men or 5 percent of the entire population of San Francisco are infected with HIV.

Volunteer samples give larger estimates of prevalence of infection. The San Francisco City Clinic Cohort was obtained by sampling from the 6875 homosexual/bisexual men recruited from sexually transmitted disease clinics in 1978 for ongoing studies of the prevalence, incidence, and prevention of hepatitis B virus infections. The prevalence of HIV infection in the City Clinic Cohort was determined at five waves of data collection between 1978 and 1985. Prevalence increased from 4 percent in 1978 to 69 percent in 1985. Thus, other estimates of the prevalence of infection in the homosexual/bisexual community using STD clinic or other convenience samples (e.g., the MACS) may overestimate prevalence and incidence of infection among homosexual/bisexual men.

Kingsley, et al. (1987) reported that 45 percent of the MACS cohort were seropositive at entry to the study and that the six-month seroconversion rate was 3.8 percent (2.5 percent in Pittsburgh, 3.5 percent in Baltimore, 4.5 percent in Chicago, and 4.5 percent in Los Angeles). Martin (1987a) reported from New York that seroprevalence was 36 percent, with a six month incidence of infection being 2 out of 230 seroconversions.

San Francisco may represent the extreme of seroprevalence (at 50 percent infected). New York may have a similar seroprevalence rate. Areas of intermediate prevalence appear to include Miami/Fort Lauderdale, Los Angeles, Houston, and Washington D.C. Prevalence of infection in homosexual men in these locations might be between 10 and 30 percent. Seroconversion rates found in the current cohort studies may not reflect the conversion rates in the population of homosexual and bisexual men. Participation in an epidemiological investigation of AIDS in which detailed questions about sexual behavior are asked must work to modify risky behavior. Further, all of the cities in the MACS suffer a high to middle incidence rate for frank AIDS.

Fleming, et al. (1987) reported a high rate of HIV seropositivity among homosexual men diagnosed with STDs at community clinics in New Mexico. This may indicate that HIV transmission is continuing in low AIDS incidence areas at rates significantly higher than other areas currently under investigation.

HOW MUCH BEHAVIOR CHANGE HAS OCCURRED?

Studies of Sexual Behavior in Homosexual and Bisexual Men

Table 1 presents the studies documenting change and stability in sexual behavior among homosexual and bisexual men by means of cross-sectional, retrospective, or longitudinal research designs. Four studies were available from San Francisco, three from New York, two from Los Angeles, and several from other cities with middle to low incidence rates for AIDS.

SAN FRANCISCO

The AIDS Behavioral Research Project (McKusick, et al., 1985a&b) recruited 824 volunteers from bars, baths, and advertisements requesting men in relationships or who were celibate. The Hepatitis B/AIDS Cohort (Doll, et al., 1987) was recruited to test the prevalence and efficacy of the hepatitis B vaccine. Two studies using population-based samples recruited through different methods have also been completed in San Francisco. The San Francisco Men's Health Study (Winkelstein, et al., 1987a) cohort was selected using multi-stage household sampling techniques from the 19 census tracts in San Francisco with the highest cumulative incidence of AIDS. Communication Technologies, Inc. (1987) has conducted continuing waves of 30-minute telephone surveys since 1984 of 500 self-identified homosexual and bisexual

men residing in the City and County of San Francisco. Households were selected according to a scheme weighting each census tract for the number of unmarried males in that tract. Random households were selected from listed telephones in the census tracts. In the fourth wave, 189 interviews were conducted with respondents interviewed at times one through three; an additional 201 cross-sectional interviews were completed to test sensitization effects. In each assessment, about 75 percent of the qualified contacted respondents completed an interview.

NEW YORK:

Martin (1987a) recruited 291 subjects through homosexual organizations, public health clinics, and a homosexual pride festival. An additional 454 were recruited through referrals to the study from the original 291 subjects. The major criteria for entry into the study were self-identification as homosexual, residence in New York, and not being diagnosed with AIDS. Juran (1987) studied 108 individuals recruited from homosexual bars in Greenwich Village; these people were compared with additional subjects recruited from heterosexual bars. Siegel, et al. (1987) studied 162 asymptomatic homosexual men recruited for a longitudinal study of patterns of change and stability in homosexual men' sexual practices.

LOS ANGELES

Communication Technologies, Inc. (1986) completed a random telephone survey of listed households in 40 census tracts in Hollywood, West Hollywood, and Silver Lake (the areas with the presumed highest concentration of homosexual men) with a response rate of 59 percent Klein, et al. (1987) surveyed 132 homosexual-identified physicians and university students regarding their sexual practices.

OTHER AREAS:

The MACS Cohort consists of 4955 volunteers from Chicago, Pittsburgh, Baltimore, and Los Angeles. Baseline assessments occurred between April 1984 and March 1985. The last assessment occurred between April 1986 and March 1987 and included 3581 (73 percent of baseline) participants (Fox, et al., 1987b). Joseph, et al. (1987b) is completing intensive studies on a subsample of MACS participants from the Chicago site. Volunteer samples have also been studied in Mississippi (Kelly, et al., 1987), Minnesota (Heckert, 1987), Ohio (Calabrese, et al., 1987), Texas (Johnson and McGrath, 1987) and New Mexico (Jones, et al., 1987).

The majority of the subjects in these studies are white and college educated (see Table 1). Further limits on generalizability include the fact that most studies are based on convenience samples. When probability samples were drawn, they occurred from strictly defined areas (SFMHS) or used techniques that sampled only listed households. Longitudinal studies have been conducted only in San Francisco, New York, and the MACS cities (Los Angeles, Chicago, Pittsburgh, Baltimore). In addition, when current levels of high risk behavior are reported, they are in terms of unprotected anal intercourse. Some of these figures are alarmingly high (well over 50 percent in some areas). However, what is not known is the extent to which HIV negative individuals might be selecting only other HIV negative individuals to have sex with and likewise, HIV positive individuals may be limiting their partners to those that are HIV positive (although inadvisable, this practice does not lead to new infections). Researchers are beginning to attempt to document this practice when "unsafe practices" are reported and HIV status is known.

Changes in Behavior

Table 2 presents changes in reported sexual behavior, and the time periods for which these changes were documented. Dramatic behavior changes have occurred, and this accomplishment needs to be acknowledged. The degree and kinds of changes documented in this literature probably exceed anything documented to date in the public health education field. Thus, the overall AIDS risk reduction campaign is working among homosexual and bisexual men, at least to the extent that these studies provide an accurate reflection of the degree of change in this risk group.

The San Francisco Studies report impressive changes. The Hepatitis B/AIDS Cohort study recorded, over a 7 year period of assessment, a 91 percent reduction in number of male sexual partners, and 96 percent and 92.2 percent reductions in unprotected anal intercourse receptive and insertive, respectively.

The AIDS Behavioral Research Project documented reductions of 45.6 percent in unprotected anal intercourse from 1984 to 1986. The San Francisco Men's Health Study (Winkelstein, et al., 1987b) reported reductions of 59.7 percent (receptive) and 66.4 percent (insertive) in unprotected anal intercourse among men who were HIV positive. Communication Technologies, Inc. (1987) reported 100 percent (receptive) and 80 percent (insertive) declines in these activities.

New York results are more variable. Martin (1987a) reported 71 to 77 percent reductions in number of male sexual partners and number of sexual encounters involving anal intercourse during the previous year. Siegel, et al. (1987), however, reported only an 18 percent reduction in the percentage of persons having multiple male sexual partners. Anal intercourse data were not reported.

Other Areas: The MACS (Fox, et al., 1987b) cohort had only a 28 percent decline in anal intercourse receptive (with 48 percent of the men still practicing this activity at the last assessment) and a 28 percent decline in anal intercourse insertive (with 55 percent of the men still practicing this activity at the last assessment). Joseph, et al. (1987a) reported a 75 percent decline on this variable, but this was among a subset of the Chicago MACS subjects volunteering for her substudy. Fox, et al. (1987b) reported no differences in behavior changes among the four study sites. Thus, the changes reported by Joseph, et al. (1987a) appear to be in excess of those measured for the entire cohort.

Current Levels of High Risk Behaviors

Levels of high risk behavior appear to be lowest in San Francisco. The mean/median number of sexual partners for 1986 was estimated at 1 to 1.5; only 1 to 6 percent of the population were engaging in unprotected anal intercourse receptive at that time (Communication Technologies, Inc., 1987). This low rate of high risk behaviors probably accounts for the flattened rates of seroconversion reported by Winkelstein, et al. (1987a) and the sharp decline in the incidence of rectal gonorrhea reported by the San Francisco Department of Health (Pickering, et al., 1986).

Reports from New York and the different MACS cities raise serious concerns about continued levels of high risk behaviors in other areas, however:

- Men in the Martin (1987a) cohort reported a mean of 20 individuals with whom they practiced unprotected anal intercourse receptive and 25 individuals with whom they practiced unprotected anal intercourse insertive in the past 12 months. These data showed more change than reported by Siegel, et al. (1987) or Juran (1987).

- 48 percent of the MACS participants reported engaging in anal intercourse receptive in 1986; 55 percent of the MACS participants engaged in anal intercourse insertive at the last visit. They reported using condoms with only 35 percent and 41 percent of partners.

- The mean number of partners with whom one had engaged in unprotected anal intercourse in Los Angeles in 1986 was 1.6 compared to 1.0 in San Francisco at the same time (Communication Technologies, Inc., 1986, 1987).

- Participants in Mississippi reported a mean of 19.7 partners with whom they had practiced unprotected anal intercourse receptive during the past 12 months (Kelly, et al., 1987a).

- 70 percent of men at New Mexico STD clinics reported practicing receptive anal intercourse during the preceding 12 months; 87 percent stated that their partners used condoms in less than 10 percent of the receptive exposures (Jones, et al., 1987). Thus, 67 percent of the participants practiced receptive anal intercourse without condoms.

- 25.1 percent of men in Texas reported practicing anal intercourse receptive (Johnson and McGrath, 1987).

- 25 percent of men in a study in Boston reported practicing unprotected anal intercourse in the previous month (McCusker, et al., 1987).

- 35 percent of the seronegatives and 7 percent of seropositives reported never using condoms during anal intercourse in Vancouver, Canada (Willoughby, et al., 1987).

Condom Use

Table 3 presents available data on condom usage. Risk reduction campaigns have stressed the importance of using condoms if a person chooses to engage in intercourse with anyone aside from a steady partner with whom one

has had a monogamous relationship for several years, or with whom one now has a monogamous relationship and the HIV status of the partner is known. As can be seen in Table 3, very little is known regarding condom use at baseline or of changes in condom use over time. As several reports have documented a decline in overall sexual activity, it is difficult to evaluate the degree to which these current levels of condom use are beneficial. Fox, et al. (1987b) reported that participants used condoms with 34 percent of partners, up from 14 percent at baseline. However, data were not presented on the percent of persons who practiced any unprotected anal intercourse at each assessment. This assessment is necessary to determine the absolute level of risk reduction in these communities.

A report on condom use by Valdiserri, et al. (1987) reinforces the concern that behavior changes are minimal outside of the major epidemic areas (San Francisco and perhaps New York). In a study of the men in the Pittsburgh site of the MACS, 65 percent (n = 328) reported at least one episode of anal intercourse during the six months between May and December, 1986. A total of 91 percent identified receptive anal intercourse as the highest risk sexual activity for AIDS transmission and 90 percent endorsed the belief that condoms can "reduce the spread of AIDS." Despite this awareness of health education guidelines, 62 percent of these respondents reported that they "never" or "hardly ever" used condoms during anal intercourse. Reasons for not using condoms were that condoms spoil sex (22 percent), purchasing condoms is embarrassing (18 percent), using condoms turns partners off (16 percent), condoms are not readily available (22 percent), or that condoms are used only by straights (26 percent).

Sexually Transmitted Diseases

Data on the incidence of gonorrhea have been cited as corroboration for the unparalleled risk reductions made by homosexual men. Incidence of gonorrhea dropped by 32 percent among homosexual men in Denver (Judson, 1983), by 57 percent in Seattle (Hansfield, 1985) by 63 percent in San Francisco (Zenilman, Cates, and Morse, 1986). Rectal and pharyngeal infections reported from males in New York City declined 59 percent during the years from 1980 to 1983 (Hansfield, 1985). However, examination of decline in case rates per 100,000 population from 1980 to 1985 reveal uneven declines among cities in the high, middle, and low prevalence range for AIDS. Table 4 presents AIDS cases reported per 1000 population, and the change in cases of gonorrhea and syphilis from 1980 to 1985 (the latest data available as of this writing). These data, of course, are for the entire population and not restricted to homosexual/bisexual men. These data do, however, give some indication of the variable levels of risk for infection with HIV and other STD's in different parts of the United States. Consistent and important changes have occurred in San Francisco and Seattle. Moderate but still yet important changes have occurred in Atlanta, New Orleans, San Diego, and Denver. The other cities cause concern because of increases in both gonorrhea and syphilis (Jersey City), or because one index has declined while the other has increased or remained stable (New York, Miami, Newark, Houston, Los Angeles, Washington D.C,. Boston, and Dallas).

Conclusion

Behavioral and STD data reveal uneven patterns of behavior change among homosexual and bisexual males. For many areas, reliable data are not available. Knowledge of current levels of risk are essential if program

planning is going to reflect the behavioral and attitudinal realities of high risk groups. Communities need to collect data on the behavior of high risk groups such as homosexual and bisexual men, and the Centers for Disease Control should be able to provide indicators of change using demographic data in STD surveillance. This is essential to determine motivators of behavior and to document accurately if risk reduction programs are working in the groups that need to change.

THE CORRELATES OF HIGH RISK SEX

The section will review the list of variables which have been so far identified as correlates of participation in high risk sexual activity for HIV transmission among homosexual men. This review is organized by identified specific correlates of risk.

Knowledge of Health Education Guidelines

At present, organized efforts to prevent further HIV infection are almost entirely restricted to the communication of health education messages regarding the risks of certain behaviors for HIV infection. This strategy is certainly compelling: health knowledge is a necessary cause of long-term behavior change and knowledge can be communicated to an individual relatively easily. Yet, a set of analyses from different samples draw across the nation have yielded contradictory results regarding the efficacy of health knowledge in changing risk-related behaviors.

For example, Calabrese, Harris, and Easley (1987) found in a rare sample of homosexual men living outside of the large coastal homosexual communities, that neither attendance at a safer sex lecture, reading a safer sex brochure, receiving advice from a physician about AIDS, testing for HIV antibody nor

counseling at an alternative test site was associated with participation in safer sex. Similarly, St. Lawrence, et al. (1987) found that knowledge of HIV risks was consistently unrelated to risk behaviors. However, in a prospective analysis, McKusick, et al. (1985b) found five variables to be significantly related to sustained low-risk activity in a multiple regression analysis, of which level of agreement with AIDS risk reduction guidelines was the weakest correlate.

Alternatively, Emmons, et al. (1986) found, using cross-sectional data from the Chicago MACS cohort, that of five psychosocial variables considered (knowledge, perceived risk of AIDS, perceived efficacy of behavioral change, barriers to behavior change, and social network characteristics) knowledge of AIDS risk was the most strongly associated with apparent reductions in risk behaviors. Joseph, et al. (1987a), using data from the same sample, replicated the Emmons, et al. (1986) cross-sectional findings, but found in a longitudinal analysis that knowledge of AIDS risk was not significantly related to any one of six measures of risk behavior change over time. Joseph, et al. (1987a: 92) remarked on this paradoxical finding that:

> The cross-sectional analyses examined the relationship between the regression model and accumulated behavioral change. The longitudinal analyses, which controlled for behavior at the time of the first survey, examined the relationship between this same model and the maintenance of behavior or incremental increases in behavioral risk reduction. The longitudinal analyses may therefore be measuring factors which predict either increased adherence to or maintenance of a program of behavioral risk reduction. It would not be surprising, then, if factors such as knowledge predict accumulated or initial change while they are less important in the maintenance of such behavior or further incremental changes. If true, this would suggest that during the initial period of the epidemic, factors such as dissemination of information were relatively important while at a later period the acceptance of new behaviors in one's peer network may be of greater importance.

In summary, then, a set of contradictory findings have emerged regarding the effects of health knowledge on risk reduction. To further muddy the waters, a longitudinal analysis of behavior change found that while knowledge of health education guidelines was associated cross-sectionally with risk reduction, that association disappeared when examined over time. Several explanations are available to explain these contradictory and paradoxical findings, including the possibility that the ability to demonstrate the effects of health knowledge on risk reduction is related to the state of community response to the epidemic at a particular moment in history.

Although it has not been established that health knowledge is an efficient cause of behavioral risk reduction, it is clear that it is a necessary cause of such reductions. That is, individuals must understand and believe the reasons for adapting pleasurable, intimate, and day-to-day activities before they are likely to attempt changes in such behaviors. Nonetheless, it is also becoming increasingly clear that health knowledge is not a sufficient cause of behavioral risk reduction. All of the studies described here reported a high degree of correct risk knowledge, and yet a minority of these educated men continue to engage in high risk sex. This should come as a surprise to no one: this lesson has already been learned in the attempts to educate tobacco smokers and those who drive without wearing seat belts. As this finding is perhaps the only commonality in this literature, it seems reasonable to suggest that health education research agendas should include study of the circumstances under which individuals decline to adopt safer sex guidelines, even after they have learned that certain types of sexual expression could be dangerous to themselves or to their partners.

The Use of Drugs and Alcohol During Sexual Contact

In contrast to the ambivalent findings regarding the effects of health knowledge on reducing risk behaviors for HIV infection, a more consistent literature has emerged to show that the combination of drugs and/or alcohol with sexual activity is associated with high risk sex. Stall, et al. (1986), in a cross-sectional analysis, showed that men who combine drugs or alcohol with sexual activity are consistently more likely to engage in high risk sexual activity then men who do not. They noted that the research design did not allow the attribution of causality to drug or alcohol use during sexual activity for high risk sex. Instead, six competing hypotheses are outlined which might be used to interpret this association (disinhibition, aphrodisiac, personality, social context, multifactorial, and null hypotheses -- see also Ostrow, 1987). In another San Francisco study, Communication Technologies, Inc. (1987) have consistently found, up to their fourth wave of data collection, that those who continue to practice unsafe sex are more likely to combine drugs and/or alcohol with sexual activity. Further, men who combine drugs and/or alcohol with sex are ". . . the least likely to have changed the frequency of engaging in unsafe anal intercourse since 1984." In a comparative analysis of homosexual intravenous drug users, Stall (forthcoming) found that approximately 70 percent of all high risk activity (sharing needles, unprotected active anal intercourse with ejaculation, unprotected active vaginal intercourse with ejaculation) by homosexual and bisexual HIV seropositives was conducted by men who combined drugs with sex but who did not use needles. Finally, Siegel, et al., (1987), in a multivariate discriminant analysis of a New York City data set, found that the combination of drugs and sexual activity was the most powerful contributor to the discriminant function

(the other significant variables being perception of emotional support, years engaged in sexual intercourse with males, and perception of difficulty of modifying sexual behavior).

Demographic Variables

Demographic profiles are typically reported for samples of urban homosexual men, and these samples have shown a surprising degree of agreement. By way of a summary statement, it appears that the modal homosexual man in such communities is economically advantaged, well-educated, Caucasian, professionally employed and younger than age 40. For example, on the first wave of the Communication Technologies, Inc. (1987) study in San Francisco, the modal demographic categories were: full time employment (81 percent); professional/technical employment level (32 percent); 30-34 years of age (27 percent); college graduate (36 percent); Caucasian (87 percent); and a gross annual income of $25,000 or more (44 percent). These general findings, with minor discrepancies, have been reported for a number of different samples (e.g., Doll, et al., 1987; Siegel, et al., 1987; McKusick, Horstman, and Coates, 1985c).

Certain demographic variables also seem to be correlated with participation in high risk sexual activity. For example, in the aforementioned Communication Technologies, Inc. (1987) report, men who were between 36 and 45 years of age, had an annual income between $25,000 and $40,000 were more likely to engage in unprotected anal intercourse with an exchange in semen. Those less likely to engage in this behavior were less than 35 years of age, had an annual income of less than $15,000 or greater than $40,000 and had at least some graduate education. Calabrese, et al.

(1987) also reported a strong correlation between having at least a college education and participation in safer sex. Ethnicity was not related to participation in this form of high risk sex.

The lack of empirical support for differences in rates of participation in high risk sex for distinct ethnic groups is somewhat surprising, particularly since the incidence rates for AIDS are disproportionately high among homosexual black men (Mays and Cochran, 1987). It may well be that sampling techniques designed to elicit the participation of men who live in urban homosexual neighborhoods are inappropriate for the purposes of sampling black homosexual men. The high degree of educational attainment and income typically reported for urban homosexual male samples would lend support to this argument.

The findings concerning ethnicity are replicated in data from a household sample of 823 homosexual and bisexual men drawn from the same city (The San Francisco Men's Health Study). At Wave 1 (in 1984) neither ethnicity nor employment status was related to having engaged in active anal sex without a condom, although age trends were significant (with men aged 21-30 most likely to have active anal sex without a condom). Thus, while ethnicity appears not to be related to participation in high risk sex (a finding also reported in Doll, et al., 1987), there is conflicting evidence regarding associations between age and high risk sex.

The attempt to measure the associations between age and participation in high risk sex has produced a contradictory body of findings. That is, while the Communication Technologies, Inc. study found that younger men were <u>less</u> likely to engage in unprotected anal sex with semen exchange and the San Francisco Men's Health Study found that this same age cohort was <u>most</u> likely to engage in unprotected active anal intercourse, a third study from the same

city reported no association between self-reported participation in high risk sex and age (also reported in Calabrese, et al., 1987). Perhaps these contradictory findings are related in some way to time period effects: in a fourth San Francisco study from about the same time period, McKusick, et al. (1985b) found that while men older than 40 were most likely to engage in high risk sex, they were also the most likely to reduce their risk over time. That is, it may be that the series of contradictory findings reported here are the result of variable timing of age-cohort bound changes in willingness to participate in high risk sexual activity.

Significantly more unsafe sexual activity occurs within primary homosexual relationships than between men who are not as seriously involved (McKusick, et al., 1985c). However, men in relationships are much less likely to practice unsafe sex outside of relationships than men not in relationships. That is, the risky sexual activity seems to be restricted to the men within the relationship, who may have been involved with each other for years before the onset of the AIDS epidemic. The Communication Technologies, Inc. (1987) also reports that men in monogamous relationships appear to engage in more unsafe sexual behavior than men in non-monogamous relationships.

To summarize, it appears that certain demographic variables are related to participation in sexual behavior implicated in the spread of HIV infection. Higher levels of education are related to participation in safer sex, being in a primary male relationship is related to participation in risky sexual behaviors. Further, there is some evidence to suggest that those at the middle income ranges are most likely to engage in high risk sex. The associations between age and sexual risk appear to be complex. Although there is no evidence in the data sets discussed here to support the position that ethnic minority homosexual men have disproportionately more high risk sex,

sampling techniques used to elicit the participation of urban homosexual men are likely to yield samples of rather advantaged men. For this reason, such sampling techniques are probably not appropriate to the study of homosexual black/Hispanic males, thereby casting this final theme in the demographic literature in doubt.

Health Beliefs

A set of beliefs about health, AIDS, and the relative importance of sexual activity have been found to be associated with participation in high risk sex. Regarding the latter dimension, men who had unsafe sex outside of male relationships were found on the first wave of data collection by the Communication Technologies, Inc. (1987) study to have higher agreements with negative statements regarding condom use as well as positive statements regarding the exchange of semen during oral sex. Further, they tended to score higher on a scale which measured the importance of sex relative to other aspects of life and to agree with statements regarding the difficulty of changing sexual behaviors and number of sexual partners. In addition, men who had unsafe sex outside of relationships were about 2.5 times more likely to agree with the statement "safe sex cannot be satisfying" than men who had safer sex only outside of relationships. Although these differences were not subjected to statistical tests of significance, they suggest that important differences in beliefs about the esteem and relative importance of particular sexual behaviors may exist between those men who comply with safer sex recommendations and those who do not. This conclusion is strengthened by the Doll, et al. (1987) finding that perception of difficulty in modifying sexual behavior was a significant discriminator between two groups of high- and low-risk homosexual men.

Joseph, et al. (1987b), in a careful analysis of data from the Chicago MACS cohort, tested the relationship between perceived risk of AIDS and participation in high risk sex. Although they found, in the exploratory univariate analysis, that level of risk perception was inconsistently associated with several measures of sexual risk for HIV infection, this relationship largely disappeared after adjustment for the Time 1 level of risk. After adjustment for a series of possible confounders (e.g., Time 1 behavior, demographics, AIDS knowledge, social network characteristics, and barriers to risk change), only one outcome variable was related to sexual risk, and that outcome was negative. That is, a greater sense of risk at Time 1 was related to an increase in the number of anonymous sexual partners over time. Further, it was also found that an increased sense of risk was significantly related to a wide range of psychological dysfunction including obsessive/compulsive behavior, social role impairment, AIDS-related negative affect, AIDS-related worries or concerns, and cognitive impairment. To interpret the findings that increased perception of risk is not related to risk reduction over time but is related to psychological impairment, Joseph, et al. (1987b) conclude:

> . . . it is important to keep in mind the idiosyncratic nature of the threat of AIDS. The debilitating and devastating syndrome itself, the multiple uncertainties surrounding the natural history of HIV infection, and the frequently homophobic environment in which political debate and policy making occur operate together to increase the sense of threat from multiple sources; most of these appear to be beyond the control of the individual. In this context, it has seemed reasonable to suggest that widespread HIV antibody testing in at-risk populations might at least provide individuals with important data concerning their potential risk of AIDS. Reasonable though this suggestion may be, results reported here suggest that such recommendations should be developed cautiously and that the anticipated benefits be weighed carefully against the observable costs.

Finally, Joseph, et al. (1987b) compared the cross-sectional and longitudinal predictors of behavioral risk reduction, an analysis that has already been discussed under the section on health knowledge. Relevant to the discussion of health beliefs, it was found that sexual impulse difficulty and belief that biomedical technology would soon cure AIDS were associated with high risk behavior. Further, perception that one's peers were reducing risk was related to risk reduction. Longitudinally, however, the relationship between belief in biomedical technology disappeared, while the relationship between sexual impulse difficulty and high risk behavior remained and the effects of perceived social network norms for risk reduction grew in importance.

To summarize, A series of beliefs about the natural history of AIDS, the importance of sexual contact, and how one's peers are reacting to reduce risk appear to be associated with willingness to participate in high risk sexual behavior for HIV infection. With the possible exception of the associations between the importance of sexual behavior in life and sexual risk, this body of findings has largely gone unreplicated among the reports reviewed here. This is not surprising, however, as the number of beliefs which could be hypothesized to be related to risk reduction is sizable, and different research projects have proceeded without many attempts at replicating belief measures. It should also be emphasized, once again, that these findings should not be regarded as static. That is, as the AIDS epidemic progresses, different beliefs can be anticipated to emerge as correlates of risky behavior. Finally, the notion that increasing perception of risk for AIDS will cause behavioral risk reductions has not been supported by empirical data. Further, increasing the sense of risk for this disease has been shown to result in a wide variety of psychological impairments. Those who wish to

prevent further HIV infection among homosexual men should work to find an effective alternative which does not result in demonstrable costs to a population already in crisis.

Personal Efficacy

Personal efficacy can be defined as the belief that one is capable of making necessary behavioral changes to reduce risk and/or improve health. To use an example from the smoking literature, although some people believe that a reduction in smoking would not likely improve their health, they feel that they are unable to take this step and can be said to have a low sense of personal efficacy. In short, if people feel that they are unable to make recommended changes in order to improve their health, recommended changes are likely to be ignored. Personal efficacy can be incorporated as one component of a larger explanatory model of health promoting behaviors (i.e., the health belief model) and has been found to be particularly important in discriminating between those homosexual men who are able to reduce risk and those who are not.

Using data from the San Francisco AIDS Behavioral Research Project, Charles (1985) looked at differences between high, medium and low risk homosexual men . He incorporated personal efficacy into an explanatory model that also included measures of perception of health threat, response efficacy (the belief that certain recommended actions can have a positive effect on health or reduce the risk to health), social skills, peer support, and self esteem. Personal efficacy emerged as th strongest correlate of patterns of sexual risk for HIV infection. Further, of all the variables studied, the relationship between personal efficacy and level of risk was the only significant relationship to behave in the predicted linear fashion. That is,

the men at low risk had the highest personal efficacy scores while the men at high risk had the lowest personal efficacy scores. In a further analysis of two-way interaction effects, significant interactions were found only between personal efficacy and belief in health guidelines. The strength of personal efficacy as a predictor of high risk sex has also been replicated by Joseph, et al. (1987a). They found that personal efficacy was significantly related to four outcome measures of sexual risk for HIV infection. Further, personal efficacy was one of the few cross-sectional correlates of high risk sex to continue to demonstrate a significant effect over time, although it was related to only one outcome measure of sexual risk upon follow-up.

Summary

The time has passed when the most interesting questions regarding sexual risk for HIV infection among homosexual men include description of how risk has changed over time. The most interesting and urgent question to be addressed in the analysis of existent data sets has become understanding the distinctions between those homosexual men who continue to maintain adopted behavioral changes over the long haul and those who do not. This section has identified some correlates of risk taking behavior which may help to guide this effort.

Even with cross-sectional designs, the efficacy of health education interventions to improve knowledge in reducing sexual risk for HIV infection among urban homosexual males who continue to engage in high risk sex has not been consistently demonstrated. Further, the literature on smoking cessation (among other health risk behaviors) has demonstrated that even long-term efforts to improve knowledge may only have a modest effect within "non-compliant" groups. More, over long periods of time, cannot be assumed to be

effective in inducing behavior changes among chronically high-risk men. The demographic correlates are useful in identifying those sub-groups of homosexual males who continue to engage in high risk sex, who are then assumed to be "underserved" by health knowledge campaigns. However, it should be pointed out that fixed characteristics may not be especially useful handles in attempts at encouraging behavior change: men can hardly change their ethnicity, age or socio-economic status if such variables are found to be associated with risk.

Variables which are associated with the process of engaging in high risk behavior show more promise in developing ways to induce permanent behavior change. More work should be devoted to understanding the connections between high risk sex and concurrent drug/alcohol use, and between high risk sex and personal efficacy. Second, more thought should be devoted to developing ways that men can develop more self-efficacy and to reducing risk associated with drug/alcohol use patterns beyond making them aware of these associations through the media. Further, some of the health belief items hint at interesting attitudinal factors in engaging in high risk sex. There is no compelling reason why placing a high value on sexual expression should be associated with participation in high risk sex. Nor should there necessarily be a connection between belief that one has resolved a HIV infection and increased risk for a second infection. Do these measures hint at some as yet unidentified processes important to participation in high risk sex?

Some variables have received little in the way of empirical support, but certainly deserve further study. Centrally important among these is the finding by Joseph, et al. (1987b) that supportive norms for behavior change among homosexual men are associated with lowered risk for HIV infection over time. More work should be attempted which replicates this finding and

explores how such supportive social norms encourage low risk behavior. It can also be expected that the processes by which persons meet and decide to engage in sexual activity are predictive of high risk behaviors. Research which is defined to study the contexts under which homosexual men decline to comply with safer sex behaviors can also be expected to identify heretofore unsuspected correlates of high risk behavior.

Although, for many people, understanding the differences between homosexual men who consistently practice safer sex and those men who do not will come late, such understandings can assist in the prevention of further HIV infections among the many homosexual men who remain uninfected.

THE IMPACT OF EDUCATIONAL PROGRAMS ON HIGH RISK BEHAVIOR

Community-Based AIDS Risk Reduction Programs

Community-based approaches are aimed at providing individuals with information and skills for behavior change, and simultaneously at providing a social environment that supports behaviors which prevent the spread of AIDS. On the basis of social learning theory, the problem of sustaining health-related behaviors is a particular focus of concern (Bandura, 1977). While some individuals may be able to act on knowledge alone and others may be able to provide self-reinforcement for activity, some have difficulty making and sustaining meaningful behavioral changes. However, when specific health-related behaviors become less socially acceptable in a community (and others are sanctioned to take their place), and when perceived social sanctions regarding unhealthy behaviors are persistent, inescapable, and occur on a regular basis, the individual is much more likely to both initiate and maintain healthful behaviors. Thus, community-based programs are designed to channel interventions through major community structures and groups to provide

information, skills, and ongoing support. The objective is to create a sum greater than the parts through synergistic action around community-wide AIDS prevention events and activities.

The Centers for Disease Control is sponsoring AIDS Community Demonstration Projects as flexible community-based research centers in six locations across the country (Denver, Seattle-King County, Dallas County, Denver City and County, New York State and City, Long Beach, and Chicago). The exact nature of the interventions differs from site to site, and the sites vary in the range of activities they employ. Generally, however, the interventions aim at three levels. At the broadest level, the interventions include public health communications to provide factual information about HIV infection and to create the impression that prevailing social norms support changes to lower risk behaviors. At a second level, the interventions include antibody testing to provide a cue to change behavior. Finally, the interventions include a variety of methods targeted to individuals resistant to change, individuals requiring additional help or skills to make changes, or individuals who have trouble maintaining the changed behaviors they have adopted.

The interventions will be evaluated by enrolling and following cohorts of homosexual or bisexual men (up to 1000 per site). The men are screened for antibodies to HIV at entry, and then followed for behavioral changes and seroconversion every 6 months. The costs of the interventions for FY '88 range from $382,430 (Dallas County) to $874,667 (Seattle-King County). Evaluations of these programs are underway and will be reported initially at the IV International Conference on AIDS in Stockholm. They should add significant and substantial data on the efficacy of concerted community-based programs on AIDS-related behavior change in the homosexual and bisexual community.

Adrien (1987) reported on a campaign to promote safe sexual practices among Montreal's homosexual population. The campaign included methods for disseminating the campaign slogan "Play Safe" (through advertisements in homosexual and regular media). Health education pamphlets on safer sex and condoms were distributed to 27 bars, clubs and baths, representing the majority of the establishments serving the homosexual community. Condom vending machines were also installed in participating establishments. A survey was distributed one month following the campaign; 839 (77.9 percent response rate) completed questionnaires were returned. Of these, 36.4 percent and 17.6 percent engaged in active and passive anal intercourse respectively without a condom; 34.3 percent used a condom in anal intercourse; 75.4 percent of these indicated that the campaign had influenced their behavior. There is no way to determine the ultimate impact of the campaign, due to lack of baseline data. However, the impact appears to have been impressive.

The changes observed in San Francisco, compared to those made in other cities, reflect to some extent the results that can be expected from concerted and systematic community organization and intervention. San Francisco's risk reduction efforts have been quite successful; data converge from behavioral studies, from estimates of seroconversion, and from STD data to indicate that transmission among homosexual and bisexual men is quite low. Communication Technologies, Inc. (1987) suggested that six elements contributed to the success of the San Francisco risk reduction program: (1) a community-based program including strong leadership from within the homosexual community; (2) market research techniques to identify appropriate messages and communication channels for reaching the target audience; (3) programs to inform and motivate target audiences; (4) a focus on facilitating social and cultural change; (5) reliance on multiple channels of communication including print, broadcast, and

face-to-face channels of communication; and (6) broad-scale grass-roots participation. To that list should be added research documenting beginning levels of high risk behavior, changes over time, and the factors related to failure to change.

Antibody Testing

Antibody testing has been advocated as a method for encouraging behavior change. Testing should be accompanied by education and counseling for risk reduction, with appropriate referrals for follow-up medical and psychological care. Proponents have claimed that testing might motivate reductions in high risk behavior. Opponents have claimed that the risks of discrimination or psychological distress far outweigh the benefits of mandatory testing, and that high risk persons have already been motivated to reduce risk of infection anyway. Data are available on the AIDS Behavioral Research Cohort beginning in 1984 before antibody testing was available; the most recent survey of the cohort occurred in November 1986. Testing for antibodies to HIV was done under the best conditions available, due to the California laws protecting confidentiality of results and mandating pre- and post-testing counseling and education. Thus, results drawn from this literature cannot be generalized to areas that do not have these guarantees. This would be especially the case should testing occur without privacy guarantees or with mandatory reporting.

Before testing was available, a majority (69 percent) indicated that they desired testing. Interestingly, by 6 to 8 months after testing had been available, only 23 percent had been tested and only 8 percent still desired testing. By November, 1986, still less than a majority had been tested. This may well have changed, however, due to the increase in testing in the general

population since that time. The majority (88 percent) were tested at the Alternative Testing Centers , and most received counseling (82 percent) and the results face to face. Most said that they would undergo this process (including learning test results) again. Not surprisingly, this was more true of those who tested negative than those who tested positive.

Did the testing and counseling process make a difference in high risk sexual behavior? Coates, Morin, and McKusick (1987a) reported that significant and substantial changes occurred among those tested. However, the more striking result occurs among those who (unfortunately) found out that they were antibody positive by November 1986. By November 1986, 12 percent of those who were antibody positive reported practicing unprotected anal intercourse active in the past month, compared to 18 percent of those who were antibody negative and 27 percent of those who had not yet been tested (X^2 = 7.04, p = .02). All three groups reported significantly higher rates of unprotected anal intercourse active in November 84 (before antibody testing was available and before they knew their status): 48 percent of those who ultimately tested positive, vs. 49 percent of those who had not been tested and 41 percent of those who ultimately tested negative (X^2 = 1.34, p = .51). These investigators also examined the proportion of protected to unprotected intercourse after testing: antibody positives practiced protected intercourse 80 percent of the time, while the other two groups practiced this behavior only 60 percent of the time.

Stempel and Moulton (1987), also in San Francisco, examined the knowledge of HIV antibody status on 126 subjects who were part of an ongoing epidemiological study of AIDS. Changes were found in levels of unsafe sexual practices. About 20 percent reported practicing unsafe sex before notification, and this was reduced to 10 percent at 3 months post-

notification. There was a slight, but not significant, increase in distress among the seropositives, and a decrease in the same variable among seronegatives. Thus, it appears that antibody testing can contribute to additional change with minimal distress when confidentiality guarantees, anti-discrimination protections, community support, professional counseling and education are adequate.

Fox, et al. (1987a) reported data drawn from 1001 homosexual men from the Baltimore-Washington MACS site who were offered the opportunity to learn their HIV antibody status; 670 (67 percent) elected to do so. Disclosure of results occurred during the third clinic visit (April to October 1985); participants were given results with individual counseling and education about the results, their meaning, and the importance of safer sex practices. Follow-up data on sexual practices were obtained 6 months later at the next clinic visit. There were no differences between men electing and not electing to receive their results in terms of age, race, number of male partners in the 6 months before disclosure, and proportion with antibodies to HIV. Those ultimately finding out that they were seropositive were more likely at baseline to be more sexually active and to practice unprotected anal intercourse than those ultimately finding out that they were seronegative. There were striking results by HIV status. Seropositives and seronegatives differed at baseline in mean level of sexual partners and activities; means at the final follow-up differed only slightly (although standard deviations appear to vary markedly among the four groups). For this reason, results were presented as percent change at follow-up from baseline in number of persons with whom an individual engaged in unprotected anal intercourse. Aware seropositives decreased unprotected anal insertive intercourse to 42 percent of baseline levels (compared to 59 percent for seronegatives and 52 percent

for the uninformed group); aware seropositives decreased unprotected anal receptive intercourse to 42 percent of baseline (compared to 62 percent for the seronegative group and 57 percent for the uninformed group. All differences between informed and uninformed groups were statistically significant.

McCusker, et al. (1987) reported the impact of antibody test results on 290 homosexual men in Boston. The level of all sexual activities of all study participants declined over time. There were no differences in receptive anal intercourse among those receiving vs. not receiving their results with 58 percent (of 125) of those initially unprotected intercourse of the entire group still practicing receptive anal intercourse unprotected six months after initial assessment. Sixty percent (of 125) of those who received test results and who practiced insertive anal intercourse at baseline still practiced this activity 6 months later; this included 62 percent of those who found out that they were negative and 52 percent of those who found out that they were positive. Eighty percent of those who practiced this activity at baseline and who were positive but failed to receive this result still practiced this activity.

Willoughby, et al. (1987), followed a cohort of approximately 600 homosexual men recruited through general practitioners. An analysis of 430 men completing two visits revealed that 150 seropositives reduced mean number of annual sexual partners from 9.2 to 5.8 ($p<.001$) as compared to 280 seronegatives (6.9 to 6.7, not significant). Even when the analysis was restricted to those in the highest 50 percent of sexual behavior, the seropositives changed more than the seronegatives (16.2 to 7.7 partners, $p<.001$, compared to 15.6 to 10.9 partners, $p<.001$). In addition, 35 percent of the seronegatives but only 7 percent of the seropositives reported never using condoms during receptive anal intercourse.

Not all studies report a positive effect of HIV antibody notification on behavior. Soucey (1986) reported on the participants in the Chicago MACS who elected to learn their HIV antibody results. As of that report, 200 of 800 men received their results; 74 of these men were in the Joseph, et al. (1987b) cohort and were studied. 34 were positive and 40 were negative. Up to 3 months following disclosure, there was one significant difference between seropositives receiving and not receiving disclosure of results. Those who were positive and received their results increased receptive anal contact compared to those who were positive and did not receive their results. In addition, those who were positive and received their results manifested increased mental health symptoms compared to those who did not receive their results. Thus, the mental health consequences of disclosure and a possible adverse consequence in terms of risk were suggested. Larger samples and more follow-up are needed to confirm these findings. Martin (1987b) also suggested an additional adverse consequence of antibody result disclosure, namely that negative men increase risky activity due to the belief that they are somehow invulnerable to the effects of HIV. Again, this consequence awaits confirmation and replication.

The costs of antibody testing with appropriate counseling and education have been computed by the Coalition for AIDS Prevention and Education (1987). This group included in its costs the following necessary elements: (1) Pre-test counseling for a minimum of 30 minutes (including individualized risk assessment, recommendations for behavior change, informed consent); (2) testing; (3) post-test counseling for a minimum of 30 minutes to assess reaction to the test result, risk behavior, and need for additional services; and (4) follow-up counseling in special cases where the individual's commitment to behavior change is unclear or where severe psychological distress is evident. The costs averaged about $80.00 per person.

It appears that testing can reduce levels of high risk behavior by 50 to 75 percent in those studies which have found testing to have had a beneficial effect. The ultimate level of high risk behavior depends on several factors, including the baseline prevalence of high risk activity, the prevalence of infection in the community, and other risk reduction activities in the community.

Contact Tracing

Tracing sexual or needle sharing contacts of those found to be HIV positive is designed to trace infection to its source. Ideally, appropriate education and counseling of the infected and susceptible contacts will prevent further transmission. While contact tracing would be impossible with individuals who have large numbers of sexual partners (and whose names or addresses might not even be known), it may be useful for high risk seropositive individuals with few contacts in areas of low prevalence of infection. The following results obtained from contacts with the Colorado Department of Health between January 1986 and September 30, 1987: A total of 265 persons tested positive and were interviewed; of these about 2/3 were homosexual. From those tested, 453 partners were reported; 17 percent (77) could not be found. Of the remaining 376 (83 percent) who were located, 334 had not been tested or had previously tested negative. Of these 334, 21 percent (70) would not be tested; 264 (79 percent) were tested and received counseling. Of the 264 partners who were tested, 42 (9.3 percent of the total partners reported and 15.9 percent of those tested) were positive. No behavioral follow-up has been conducted on these or the negative individuals, but this should be a high priority research activity as this method of disease prevention has important public policy implications.

Face-To-Face Programs

The STOP AIDS Project. The STOP AIDS Project was begun in San Francisco as an innovative community-based, peer-support AIDS prevention program. Initial analyses by the originators of this project (Larry Bye and Sam Puckett) indicated that homosexual men felt helplessly caught between the growing enormity of the AIDS epidemic and the sexual values and expectations of the homosexual community. The STOP AIDS program uses a focus group model to bring people together to engender a personal commitment to safer sex and personal participation toward ending the AIDS epidemic. More specifically, the program seeks to empower personal action toward stopping the AIDS virus, to hasten the adoption of safer sex as a community norm, to build peer support for safer activities, and to create peer pressure against activities that would spread the epidemic. The intent was to quickly change the social agreement about how homosexual men have sex, to make safer sex normative and routinely-expected behavior among San Francisco homosexual males, and to get homosexual men more personally involved in AIDS prevention.

There are some indications that STOP AIDS met some of its objectives. Communication Technologies, Inc. (1987) reported in their fourth survey (in 1986) of homosexual men in San Francisco that 51 percent (up from 27 percent in 1985) of the sample had heard of the project, and 20 percent had attended a meeting. STOP AIDS records show that over 7000 men in San Francisco attended a meeting. No specific analyses were completed (nor are any studies known to have been done in San Francisco or elsewhere), however, to determine the specific impact of STOP AIDS on behavior.

The STOP AIDS Budget in San Francisco for 1986-87 was $217,864 to serve an estimated 3500 individuals in groups. That translates to $62.24 per individual in a group. However, the ultimate impact of the program also needs to be estimated in relation to change in the community norms and behaviors of individuals not attending these meetings.

Multi-Session Interventions. Face-to-face programs may be needed for certain kinds of individuals to change behaviors. Especially when individuals have a longstanding history of engaging in high risk activities, when the immediate consequences of risky behavior are reinforcing, and when the behavior is encouraged or expected by others, more potent behavior change programs may be needed to promote risk reduction. Kelly, et al. (1987a) recruited and randomized 104 homosexual men with a history of frequent high risk behavior into experimental and wait list control groups. The experimental intervention consisted of 12 weekly group sessions which provided AIDS risk education, cognitive behavioral self-management training to refuse coercions, and attention to the development of steady and self-affirming social supports. At 4 month follow-ups, men in the experimental group reported only 0.2 episodes of unprotected anal intercourse (compared with 1.2 at baseline) in the previous month. The control group mean was 1.2 (compared to 0.9 at baseline). Experimental subjects reported using condoms in 70 percent of intercourse occasions at follow-up, compared to 40 percent at baseline. Comparable rates for control subjects were 20 percent at follow-up and 32 percent at baseline.

Coates, McKusick, et al. (1987) recruited HIV antibody positive men into a study of the effects of stress management on behavior and immune function. The intervention was an 8-week program of weekly meetings and one retreat emphasizing meditation, relaxation, positive health habits, and coping with

the stress of being seropositive. A total of 64 men participated, 32 in the experimental group and 32 in the wait-list control group. At post-treatment, the experimental subjects reported a mean of 0.50 partners in the previous month (1.37 at baseline) compared to 2.29 for the control subjects (1.09 at baseline).

Quadland, et al. (1987) are conducting an evaluation of four different AIDS prevention education approaches in New York. These include (1) informing participants about AIDS and how it is transmitted, (2) a program of eroticizing safer sex alternatives; (3) the program described in #2 but without audiovisuals; and (4) a comparison group of individuals who simply received copies of safer sex guidelines. Involved are 619 men being evaluated before and 3 months after the program. About 25 percent of the participants were still at risk by virtue of having engaged in at-risk sexual activity in the previous 60 days. No further data were available.

Multi-session interventions generally cost between $1,500 and $2000 to mount. The upper limit of group members is usually set at 12 to 15. Thus, these interventions cost between $100 and $200 per person; 2 group leaders are paid an average of $25 per hour for eight 4-hour sessions. ($50.00 x 4= $200 per session, $200 x 8=$1600/ 12 = $133.00 per person in a group of 12).

RESEARCH NEEDS

This paper has reviewed what is known about AIDS risk reduction among homosexual and bisexual men. In doing so, it has made clear that investigational needs are vast. The following provides an overview of specific research needs which urgently need to be addressed (Coates, et al., 1987b).

Data Collection and Evaluation

1. Pinpointing Community Behavior. This review was somewhat frustrating to complete because it revealed the lack of information that exists regarding the behavior of high risk groups. Data on prevalent sexual practices were located from only a handful of cities: San Francisco, Los Angeles, Chicago, Baltimore, Pittsburgh, and New York. All of the other studies are from small samples of volunteers. Many cities in the middle to high prevalence of ranges of AIDS cases could benefit enormously from better estimates of sexual behavior among homosexual and bisexual men. The example in San Francisco is clear. Data were collected and used systematically to design educational campaigns. Data were collected further to determine the efficacy of the programs and the pockets of individuals who were not responding to them. Low prevalence cities might benefit from determining if the conclusions of this body of research are also true for their areas, and specifically if behavior change is slower where the AIDS epidemic is not overwhelming. Documenting that behavior has not changed enough to prevent further spread of HIV infection and using the information to facilitate program design should be an important priority for low incidence cities (Communication Technologies, 1987).

2. Uniform Reporting Systems. There is a clear need for a uniform system for reporting data. Studies need to determine which period of assessment provides the most accurate reflection of an individual's sexual activities. Studies use periods of 1, 3, 4, 6, and 12 months. It is not clear if science or custom dictates that measurement interval. In addition, studies vary in the detail in which they gather and report behavior. At a minimum, it would be useful for each study to ask about the frequency of specific sexual activities that are known to be high risk, and to report both

mean frequencies (along with standard deviations) and percentages of individuals engaging in these activities. Comparison among studies is essential; this method of gathering and reporting data would facilitate such comparisons.

Specific Groups Needing Special Research Attention

1. Black and Latino Homosexual and Bisexual Men. AIDS is a major problem for men who are both homosexual and members of ethnic minorities. Of all those at risk for AIDS, black and Latino homosexual men may be the least studied. Given the extent of risk they face, this lack of research poses serious problems. This risk is underlined by the following observations: 1) homosexual men constitute the largest AIDS risk group among black and Latino AIDS cases (46 percent and 55 percent respectively); 2) 26 percent of homosexuals with AIDS are black and Latino homosexual men; and 3) recent reports suggest that the rate of HIV infection is higher in black and Latino homosexuals. While these figures suggest a high vulnerability to HIV infection, the reasons remain a mystery. There are almost no studies of the practices and lifestyles of minority homosexual men. Thus, there are few clues about how prevention strategies -- aimed at alerting men to the dangers of certain behaviors -- might be developed.

Bell and Weinberg (1978) studied the sexual practices of minority homosexual men (N=111) and compared these to the sexual practices of white homosexual men. The black men in the sample did not differ from the white men in frequency of fellatio (53 percent), the most frequent sexual activity. However, there were racial differences in the second most frequently performed activity and in the preference for certain activities. While some form of hand-genital contact was the technique next most employed by white men, the

blacks were next most likely to engage in anal intercourse. A total of 75 percent of the black men regularly performed insertive anal intercourse; 58 percent regularly performed receptive anal intercourse. About half of the white men most preferred either having fellatio performed on them or performing anal intercourse on their partners while most of the blacks preferred receptive anal intercourse. More blacks (90 percent) than whites (78 percent) had receptive anal intercourse. The vast majority of the black men (75 percent) in this study had greater than 250 lifetime sexual partners. Unfortunately, this study was conducted in the 1960's, prior to the AIDS epidemic, and provides no current information on such important issues as awareness of risk reduction methods among black homosexual men.

Samuel and Winkelstein (1987a) studied a very small number of black men (N=29) in the SF Men's Health Study cohort. They found a slightly elevated number of blacks with 2 or more partners with whom they practiced receptive anal intercourse (65 percent vs. 57 percent for the whites) and more rectal douching among the blacks (65 percent vs. 42 percent for whites). Even controlling for these differences, however, there was still a marginally significant increased risk of seroconversion for blacks as compared to the whites. This finding was later replicated in the MACS cohort. Potterat (1987) speculated that this difference might be due to higher rates of syphilis among blacks. Even controlling for syphilis, there was still an independent contribution of race and the interaction between race and syphilis was not significant. Thus, more research is needed to explain the higher rates of seropositivity among blacks.

Awareness of the risk association with sexual practices among minority homosexuals is critical. One published report (Williams, 1986) described a community survey in Detroit which found that black homosexuals

were less informed about the AIDS epidemic than black IV drug users. Among the black homosexual men surveyed, only 8 (13 percent) of the 62 respondents correctly identified that the AIDS virus was transmitted through blood and semen. Poor understanding of how the virus is transmitted could explain why only 12 (19 percent) of the respondents expressed that they were very worried that they might get AIDS. Approximately 37 percent reported they were not worried about possible infection.

2. **Low Income and Low Education Individuals.** The sampling strategies used to sample homosexual/bisexual men have yielded individuals who are most likely to respond to educational programs: the middle income and college educated. Numerous studies have determined that response to knowledge of health risk are correlated with these two variables. Data are needed on the prevalence of high risk behaviors among other socioeconomic strata to describe current levels of high risk behaviors and the impact of behavior change programs designed for these individuals in mind.

3. **Homosexual Adolescents.** Little attention is being given to the problems of homosexual adolescents. There are no specific data on the prevalence of HIV infection among homosexual youth. A study of homosexual/bisexual male teens found a mean of 7 sex partners annually, with 45 percent reporting a past history of sexually transmitted diseases. While relatively few AIDS cases have been reported among adolescents, approximately 20 percent of cases have occurred in individuals aged 20-29 years. Since the incubation period of AIDS exists in the range of years (Curran, et al, 1985), an argument can be made, based on the AIDS caseload data, that HIV transmission has been occurring for some time in the adolescent age group. Despite the proven efficacy of condoms, approximately 51 percent of adolescents fail to use any type of contraceptive at their first sexual

intercourse experience, and 26 percent report never using contraception (Zelnick and Kantner, 1980). National data indicate that only 7 percent of adolescents (ages 13-19 years) utilize condoms (Dryfoos, 1982). It is clearly desirable to assess the efficacy of AIDS prevention methods before HIV infection becomes highly prevalent in the group at risk, "...today's adolescents, who are not yet infected (by HIV) and who are newly exploring their homosexual lifestyles, are among those persons most likely to benefit from preventive effort" (Remafedi, 1987).

4. **Bisexuals** Specific data regarding the prevalence of male bisexuality in the population, the prevalence of HIV infection in male bisexuals, the degree to which this group has been influenced by AIDS risk reduction education, and the potential for spread of infection to heterosexuals do not yet exist.

Intervention Strategies

Data evaluating the efficacy of various interventions for AIDS risk reduction are sparse. Evaluations are needed to determine which approaches are efficacious for entire risk groups and for individuals in those risk groups who are resistant to change. The following topics deserve priority:

1. **Community-Intervention Approaches.** The San Francisco model of AIDS risk reduction relies heavily on shifting community norms so that low risk activities are practiced routinely by the community. The goal has been to change community norms so that to engage in high risk sex violates norms. In addition, multiple channels of influence are used to inform, to teach skills, and, to motivate persons to change. The Centers for Disease Control demonstration projects are also built on variations of this model. Certainly, this model should be replicated in its entirety in middle and high prevalence

cities; low prevalence cities might be able to avoid the ravages already experienced in many places by instituting and implementing these kinds of broad-based interventions. Stages in community interventions involve (1) engagement of community leaders and organizations in the change process; (2) analysis of existing formal and informal networks and avenues of influence; (3) analysis of community behaviors, and their determinants, including perceived norms; (4) intervention design and implementation; (5) process evaluation to determine the efficacy of programs and needed additional interventions. The campaign should focus on information, attitude change, skill training, and community norm modification. Avenues of intervention include media, formal structures which exist and through which interventions can be delivered (i.e., churches, schools, health care, etc.), new structures created for education, and specific strategies to modify community norms.

2. Focused Counseling at STD Clinics. STD, family planning, and drug abuse clinics reach an especially high risk population. Attendance at these clinics implies that one has been or is planning to become sexually active, to use intravenous drugs, or both and therefore may be infected with HIV. Special techniques and procedures for mobilizing counseling, education, and motivation in these clinics could be implemented and evaluated so that theoretical and practical advances can be made in our ability to promote behavior change. Special attention could be given to the implementation and evaluation of strategies for shifting the norms of these groups so that low risk activities are expected.

3. Health Care Providers. Every encounter with health care providers could provide the opportunity for assessment of risk for AIDS, counseling for risk reduction, and follow-up as needed. Health care providers have been effective in promoting smoking cessation. They are looked upon as credible

sources of health information. By placing AIDS risk reduction on their patients' agendas, providers can raise patients' awareness, assess specific practices that place patients at risk, and advise them about risk reduction. This agenda item is even more compelling because of recent studies of the health care profession. Kelly, et al. (1987b), in studying random samples of physicians in Columbus, Phoenix, and Memphis found that harsher attitude judgments and decreased willingness to engage even in routine conversations were more likely to be associated with persons with AIDS than with leukemia.

4. Condom Distribution Programs. Methods of making condoms more available to risk groups and evaluations of the efficacy of these programs should be undertaken.

Conclusions

This review has focused on the epidemiology of male-male HIV infection, the behavioral changes already made among homosexual male populations to prevent further HIV infection, the correlates of the remaining low levels of high risk sexual behavior within that community, and programs which have been initially developed to encourage further risk reduction among homosexual/bisexual males. Although considerable community-based support exists for risk reduction, formal programs among homosexual and bisexual men for prevention of transmission of HIV may be vastly underfunded. Flynn, et al. (1987) found great disparity between resources available for prevention of transmission through testing, blood donations. While $206,000 was spent to prevent an estimated 15 transmissions by transfusion, only $87,920 was spent to prevent transmission among individuals at high risk for HIV infection, in whom approximately 534 transmissions occurred. Thus, the potential to continue to prevent further HIV infection among homosexual/bisexual men has not been

entirely realized. Program development must proceed while taking into account basic risk research that incorporates a strong evaluation component. Thus, both risk ascertainment and evaluation research are essential components of program development. Establishing effective HIV prevention programs, responsive to both survey and evaluation research and involving target communities, will be one of the most important challenges to public health practitioners as this epidemic continues.

Table 1
Description of Studies

Study	Sample N	Age	% White	Income (>$20K)	Education (some college)
SAN FRANCISCO					
AIDS Behavioral Research Project (McKusick et al.1985)	454 volunteers	m=32	90%	m=$24,000	67%
San Francisco Mens Health Study (Winkelstein et al. 1986)	799 probability sample	r=25-55	87.4%	—	88%
Hepatitis B/AIDS Cohort (Doll, 1987)	126	m=39	87%	—	m=15.3 yrs
Communication Technologies (1987)	500 probability sample	m=37.6	88%	66%	---
NEW YORK					
Martin (1987)	745 volunteers	m=37.5	87%	$25,000 (mdn)	m=16.3
Juran (1986)	108 volunteers	---	---	---	---

m=mean, mdn=median, r=range, ---=not reported

Study	Sample N	Age	% White	Income >$20K	Education (some college)
Siegal (1986)	162 volunteers	m=37	94%	33% >$35k	95%
OTHER AREAS					
MACS (Chicago, Los Angeles, Baltimore Pittsburg,1987)	4933	mdn=35	95%	---	87%
Klein et al (Los Angeles, 1987)	122 university students and physicians	r=18-48	88.7% Physicians 70.9% Students	---	100%
Communication Technologies (LA) (1987)	400 probability sample	R=21-60+	86%	69%	90%
Joseph et. al. (Chicago, 1987)	465 Chicago MACS	---	---	---	---
Johnson and McGrath (Texas-3 cities,1987)	343 volunteers	---	---	---	---

m=mean, mdn=median, r=range, ---=not reported

Study	Sample N	Age	% White	Income >$20K	Education (some college)
Kelly (Mississippi 1987)	100 ads and flyers	m=30.72	88%	35%	71%
Hackert (Minnesota, 1987)	250 annual gay event	---	---	---	---
Calabrase (Ohio, 1987)	637 gay picnic and bars	r=17-67	90.1%	49.4%	74.5%
Jones et al., (New Mexico, 1987)	153 gay paper and community AIDS organization	mdn=32	---	mdn=$16,000	mdn=15

m=mean, mdn=median, r=range, ---=not reported

Table 2a
Male Sexual Partners

Study	Design and Assessment Period		Male Sexual Partners Baseline	Male Sexual Partners Last Assessment
AIDS Behavioral (San Francisco)	longitudinal 30 days		1984 ---	1986 ---
SFMHS (San Francisco)	longitudinal 6 mos		1984 ---	1985 ---
Hep B/AIDS Cohort (San Francisco)	longitudinal 4 mos		1978 mdn=16[1]	1985 mdn.=1.5[1]
Communication Technologies (San Francisco)	combined longitudinal and cross sectional 30 days		1984 m=2.8[2]	1987 1.6[2]
Martin (New York)	retrospective annual		1980-81 mdn=5	1984-85 mdn=3
Juran (New York)	retrospective annual		1983 mdn=5	1986 mdn=3
Siegal (New York)	Retrospective 30 days		1984-85 ---	1985-86 ---
MACS (Baltimore, Chicago, Los Angeles, Pittsburg)	prospective 6 mos		1984 ---	1986 ---
Johnson & McGrath (Texas)	Retrospective 30 days		1984-85 ---	1986-87 38.8%>2
Klein (Los Angeles)	Retrospective 6 mos		---	---
		physicians	---	---
		students	---	---

[1]Non-steady partners (sexual contact only once or twice).
[2]Excluding primary partner.
3Excluding those in a monogomous relationship.
— =not reported.

Study	Design and Assessment Period	Male Sexual Partners	
		Baseline	Last Assessment
Communication Technologies (Los Angeles)	cross sectional	---	1986
	30 days	---	m=1.8[3]
Joseph (Chicago)	longitudinal	1984	1985
	6 mos	---	---
Kelly (Mississippi)	cross sectional	---	1986
	12 mos	---	m=15
Calabrese (Ohio)	cross sectional	---	---
Jones (New Mexico)	cross sectional	---	1985
	12 months	---	---

[1]Non-steady partners (sexual contact only once or twice).
[2]Excluding primary partner.
[3]Excluding those in a monogomous relationship.
—=not reported.

Table 2b
Unprotected Anal Intercourse Receptive

Study	Design and Assessment Period		Unprotected Intercourse Receptive Baseline	Last Assessment
AIDS Behavioral (San Francisco)	longitudinal 30 days		1984 22.3%	1986 7.2%
SFMHS (San Francisco)	longitudinal 6 mos		1984 14.4%[1]	1985 5.8%[1]
Hep B/AIDS Cohort (San Francisco)	longitudinal 4 mos		1978 10.9[2]	1985 0.4[2]
Communication Technologies (San Francisco)	combined longitudinal and cross sectional 30 days		1984 m=2.6[3]	1987 m=.3[3]
Martin (New York)	retrospective annual		1980-81 m=70	1984-85 m=20
Juran (New York)	retrospective annual		1983 ---	1986 ---
Siegal (New York)	Retrospective 30 days		1984-85 87.4%[4]	1985-86 71.7%[4]
MACS (Baltimore, Chicago, Los Angeles, Pittsburg)	prospective 6 mos		1984 71%	1986 51%
Johnson & McGrath (Texas)	Retrospective 30 days		1984-85 ---	1986-87 25.1%
Klein (Los Angeles)	Retrospective 6 mos		---	---
		physicians	79%	35.3%
		students	79%	60.9%

[1]HIV negative only.

[2]Non-steady partners (sexual contact only once or twice).

[3]Anal intercourse with exchange of semen.

[4]"Risky" unprotected anal intercourse, oral-genital, or fisting with exchange of semen, urine or feces.

[5]Excluding those in a monogamous relationship.

— =not reported

Study	Design and Assessment Period	Unprotected Intercourse Receptive	
		Baseline	Last Assessment
Communication Technologies (Los Angeles)	cross sectional	---	1986
	30 days	---	m=1.6[5]
Joseph (Chicago)	longitudinal	1984	1985
	6 mos	40%	10%
Kelly (Mississippi)	cross sectional	---	1986
	12 mos	---	m=19.4
Jones (New Mexico)	cross sectional	---	1985
	12 months	---	70%

[1]HIV negative only.

[2]Non-steady partners (sexual contact only once or twice).

[3]Anal intercourse with exchange of semen.

[4]"Risky" unprotected anal intercourse, oral-genital, or fisting with exchange of semen, urine or feces.

[5]Excluding those in a monogamous relationship.

— =not reported

Table 2c
Unprotected Anal Intercourse Active

Study	Design and Assessment Period		Unprotected Intercourse Active Baseline	Last Assessment
AIDS Behavioral (San Francisco)	longitudinal 30 days		1984 34.7%	1986 15.4%
SFMHS (San Francisco)	longitudinal 6 mos		1984 39.6%[1]	1985 13.3%[1]
Hep B/AIDS Cohort (San Francisco)	longitudinal 4 mos		1978 12.9[2]	1985 1.0[2]
Communication Technologies (San Francisco)	combined longitudinal and cross sectional 30 days		1984 m=2.6[3]	1987 m=.3[3]
Martin (New York)	retrospective annual		1980-81 m=85	1984-85 m=25
Juran (New York)	retrospective annual		1983 ---	1986 ---
Siegal (New York)	Retrospective 30 days		1984-85 87.4%[4]	1985-86 71.7%[4]
MACS (Baltimore, Chicago, Los Angeles, Pittsburg)	prospective 6 mos		1984 80%	1986 55%
Johnson & McGrath (Texas)	Retrospective 30 days		1984-85 ---	1986-87 ---
Klein (Los Angeles)	Retrospective 6 mos		---	---
		physicians	90%	46.5%
		students	84%	67.3%

[1]HIV positive only.

[2]Non-steady partners (sexual contact only once or twice).

[3]Anal intercourse with exchange of semen.

[4]"Risky" unprotected anal intercourse, oral-genital, or fisting with exchange of semen, urine or feces.

— =not reported.

Study	Design and Assessment Period	Unprotected Intercourse Active	
		Baseline	Last Assessment
Communication Technologies (Los Angeles)	cross sectional	---	1986
	30 days	---	---
Joseph (Chicago)	longitudinal	1984	1985
	6 mos	40%	10%
Kelly (Mississippi)	cross sectional	---	1986
	12 mos	---	---
Jones (New Mexico)	cross sectional	---	1985
	12 months	---	---

[1]HIV positive only.

[2]Non-steady partners (sexual contact only once or twice).

[3]Anal intercourse with exchange of semen.

[4]"Risky" unprotected anal intercourse, oral-genital, or fisting with exchange of semen, urine or feces.

--- not reported.

Table 3
CONDOM USE

Study	Baseline	Last Assessment	%Change
San Francisco			
AIDS Behaviorial Research Project (1985)	**1982** 14.1%	**1984** 23.8%	+1.7
Communication Technologies (1987)	**1984** m=0.03[1]	**1987** 0.3 23% both waves	0
New York			
Martin (1987)	**1980-81**	**1985-85**	
Active	1%	20%	20
Receptive	2%	19%	9.5
Other Areas			
MACS (Baltimore, Chicago, Los Angeles, Pittsburg)	**1984** 13%	**1986** 29%[2]	2.2

[1] mean frequency usage per secondary partner.
[2] receptive anal intercourse.

Table 4: Prevalence of AIDS and Declines in Gonorrhea and Syphyllis

City	AIDS Cases[1] (per 1000 pop)	Gonorrhea[2] (1980-85 change)	Syphyllis[2] (1980-85 change)
San Francisco	1.25	-62.6%	-48.9%
New York	1.19	-10.0%	+01.6%
Jersey City	0.38	+07.1%	+01.2%
Miami	0.72	-50.4%	+57.4%
Newark NJ	0.53	-10.0%	+5.3%
Houston	0.49	-49.0%	+13.9%
Los Angeles	0.48	+1.6%	-25.6%
Washington DC	0.42	-08.2%	-33.9%
Atlanta	0.33	-21.0%	-18.2%
New Orleans	0.30	-14.9%	-26.4%
San Diego	0.29	-21.0%	-21.0%
Dallas	0.27	-21.0%	+31.6%
Seattle	0.25	-38.2%	-66.6%
Denver	0.24	-27.0%	-23.2%
Boston	0.24	-06.2%	+07.5%
US Total	0.17	-13.4%	-13.0%

[1] Source: AIDS Weekly Surveillance Report-United States, October 12, 1987

[2] Source: U.S. Department of Health and Human Services, Sexually Transsmitted Disease Statistics, Calendar Year 1985 (1987).

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